

REMARKS

Applicant replies to the Non-Final Office Action mailed on October 3, 2007, within the one month extension period. Claims 1-10 were pending in the application and the Examiner rejects claims 1-10. Applicants add new claims 11-12. Applicants cancel claims 2 and 7 without prejudice to filing one or more applications having claims with similar subject matter. Support for the new claims and amendments may be found in the originally-filed specification, claims, and figures. No new matter has been introduced by these new claims and amendments. Reconsideration of this application is respectfully requested.

In general, Applicants assert that the claims have been amended to more closely reflect working Examples 1 and 2. Applicants also present a step-by-step explanation below to demonstrate that the specification has adequate written description, and possesses utility and enabling disclosure. Similarly, Applicants also amend the claims to more closely reflect the working examples in the specification which are enabled, definite, and have utility.

Applicants respectfully disagree with the Examiner's rejections and Response to Applicant's arguments. Nonetheless, Applicants' assert that the presently amended claims render the Examiner's rejections and Response to Applicant's arguments moot.

The Examiner objects to the specification under 35 U.S.C. 112, first paragraph, as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention. The Examiner next rejects claims 1-10 under 35 U.S.C. 112, first paragraph, as based on disclosure which is not enabling. The Examiner rejects claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter. The Examiner rejects claims 1-10 under 35 U.S.C. 101 as being inoperative and lacking utility. The Examiner rejects claims 1-10 under 35 U.S.C. 112, first paragraph, as not supported by either a credible asserted utility or a well established utility. Applicants respectfully traverse these objections and rejections.

Specifically, the Examiner considers that the invention is lacking utility because the invention uses ideas that are not proven and/or contrary to modern nuclear physics and solid state physics, and even if such was possible, the specification does not describe the method in sufficient detail to enable a skilled artisan to make and use it without undue experimentation. The Examiner also asserts that hydrogen isotope localization by metal lattice (and electron shielding) is similar to hydrogen isotopes localization in other molecules, and cannot increase the

probability of nuclear fusion significantly, and refers to F. Riaola et al, 2002. The Examiner further asserts that there is no credible record to indicate a nuclear fusion reaction in the reaction furnace.

Applicants assert that the specification provides an adequate written description of the invention, and possesses utility and enabling disclosure. Similarly, the claims which have been amended to more closely reflect the working examples in the specification are enabled, definite, and have utility.

The claims have been amended to more closely reflect working Examples. Specifically, independent claims 1 and 6, and claims dependent therefrom relate to Example 1, and the remaining claims relate to Example 2. Further, the claims have also been amended to recite that the hydrogen isotope is deuterium, which is demonstrated to work in both Examples 1 and 2. The specification describes Example 1 as:

- (b) A metal nano-ultrafine particle ($\text{ZrO}_2\text{.Pd}$) provided in a reaction furnace.
- (c) Evacuation of air from the reaction furnace, and injection of deuterium gas into the reaction furnace to solid dissolve deuterium atoms in the nano-ultrafine particle to form a hydrogen condensate.
- (d) Figure 3 shows the temperature and pressure change in the reaction furnace as the gas is being injected. Note that the pressure only starts to increase after approximately 25 minutes and the temperature stabilizes just before that time. This data suggests that the injected matter must be solid-dissolving in the nano-ultrafine particles.
- (e) Ultrasonic wave transfer medium (D_2O) is injected into the reaction furnace, and ultrasonic energy is applied.
- (f) Figure 4 shows the change in external temperature of the reaction furnace after application of the ultrasonic energy which indicates the release of large amounts of energy significantly greater than that shown in (c).
- (g) Figure 5 compares the appearance of the hydrogen condensate before ([A] and [B]) and after ([C] and [D]) the application of energy. A clear difference can be seen in the general structure that should be attributed to the melting of metal nano-ultrafine particles. Since ZrO_2 has a melting point of 1850°C , this indicates that the internal temperature of the reaction furnace was in excess of 1850°C .

(h) The ultrasonic wave transfer medium was also vaporized in the process. The analysis of the gases produced (see Figure 6 and supporting descriptions) show the generation of helium by a large magnitude of an order or more, which is a byproduct of deuterium atom-deuterium atom fusion.

Example 2 describes substantially the same steps and results as (a)-(g) for Example 1 above, except that a metal composite alloy containing $Zr_3NiO.Pd$ is used instead of a metal nano-ultrafine particle ($ZrO_2.Pd$), and Example 2 refers to Figures 8 to 10. Applicants request the Examiner to note that it took a longer time to reach 10atm in Example 2, which is a significant indication that more deuterium atoms were solid-dissolved. This also correlates with Figure 11 which shows that more Helium is produced in Example 2 compared with Example 1.

Accordingly, contrary to the Examiner's assertion, Applicants assert that this is significant evidence of the fusion of deuterium atoms to produce energy and helium. The evidence clearly points to the conclusion of a fusion reaction. Even if this fusion reaction does not take place in classical and accepted theoretical models, it cannot be denied that a deuterium-deuterium fusion reaction has occurred with some release of energy.

In that regard, Applicants respectfully assert that no alternative theories exist as to how a reaction of a closed system containing deuterium atoms and substantially no Helium can result in the generation of large amounts of Helium, barring the fusion of deuterium atoms.

Therefore, the specification clearly provides an adequate written description as to how to make and use the invention without undue experimentation, and the utility thereof is clearly evident. Similarly, since the working examples of the specification are directly reflected in the amended claims, the claims must be considered to be enabled, definite, and have utility.

Furthermore, Applicants assert that there are many ways in which energy can be applied to a substance to cause a reaction, as indicated by the Examiner on page 9 of the outstanding Office Action. Therefore, Applicants assert that, since the specific metal nano-ultrafine particles and metal alloy composites are defined in the claims, one skilled in the art would easily be able to change the type of energy, and adjust the amount of energy to initiate the reaction. Claims 11 and 12 provide a more specific energy source and amount demonstrated to work with the invention.

The Examiner rejects claims 1-10 under U.S.C. 103(a) as being obvious over Chambers et al. in view of Krane. Applicants respectfully traverse these rejections.

The Examiner asserts that Chambers discloses all the limitations of the claims except that of “generating heat energy by causing at least two isotope atoms to fuse with each other due to the energy”. However, the Examiner asserts that since Krane teaches the thresholds for DT and DD fusion reactions, it would be obvious for one skilled in the art to increase the energy applied to be above said thresholds, since Chambers states that “it is possible, however, that condition for production fusion have not been met in our experiments”.

Applicants assert that the presently claimed invention is not obvious over Chambers in view of Krane for at least the following reasons. Chambers discloses a thin palladium film. Significantly, Chambers does not disclose or contemplate at least a “metal nano-ultrafine particle containing a plurality of $ZrO_2.Pd$ particles,” as similarly disclosed in independent claims 1 and 6 nor “a metal alloy composite containing a plurality of $Zr_3NiO.Pd$ particles,” as similarly disclosed in independent claims 3 and 8. These elements of the presently claimed invention are NOT equivalent to a thin palladium film. Further, such metal foils as in Chambers cannot obtain the desired deuterium to metal atom ratio necessary for the presently claimed invention. As such, Chambers does not disclose or contemplate “so that the hydrogen condensate has a deuterium atoms/nano-ultrafine particle atom ratio of 250% or more,” as similarly disclosed in independent claims 1 and 6, nor “so that the hydrogen condensate has a deuterium atoms/_metal alloy composite atom ratio of 250% or more,” as similarly disclosed in independent claims 3 and 8.

Krane does not make up for any of the deficiencies of Chambers. Therefore, the present invention cannot be considered obvious. Moreover, Applicants assert that the presently claimed invention is differentiated from the cited references for the same reasons as set forth above regarding the other rejections.

Moreover, dependent claims 4-5 and 9-10 variously depend from independent claims 1, 3, 6 and 8, so claims 4-5 and 9-10 are differentiated from the cited references for the same reasons as set forth above, in addition to their own respective features.

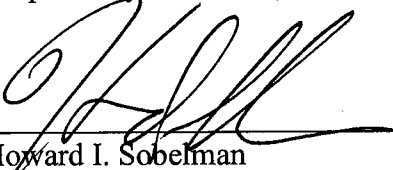
As set forth above, new claims 11 and 12 provide a more specific energy source and amount demonstrated to work with the invention. New claims 11-12 depend from independent claims 1 and 3, respectively, so claims 11-12 are differentiated from the cited references for the same reasons as set forth above, in addition to their own respective features.

Applicant respectfully submits that the pending claims are in condition for allowance. The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account No. **19-2814**. Applicant invites the Examiner to telephone the undersigned if the Examiner has any questions regarding this Reply or the present application in general.

Respectfully submitted,

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By: _____


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